

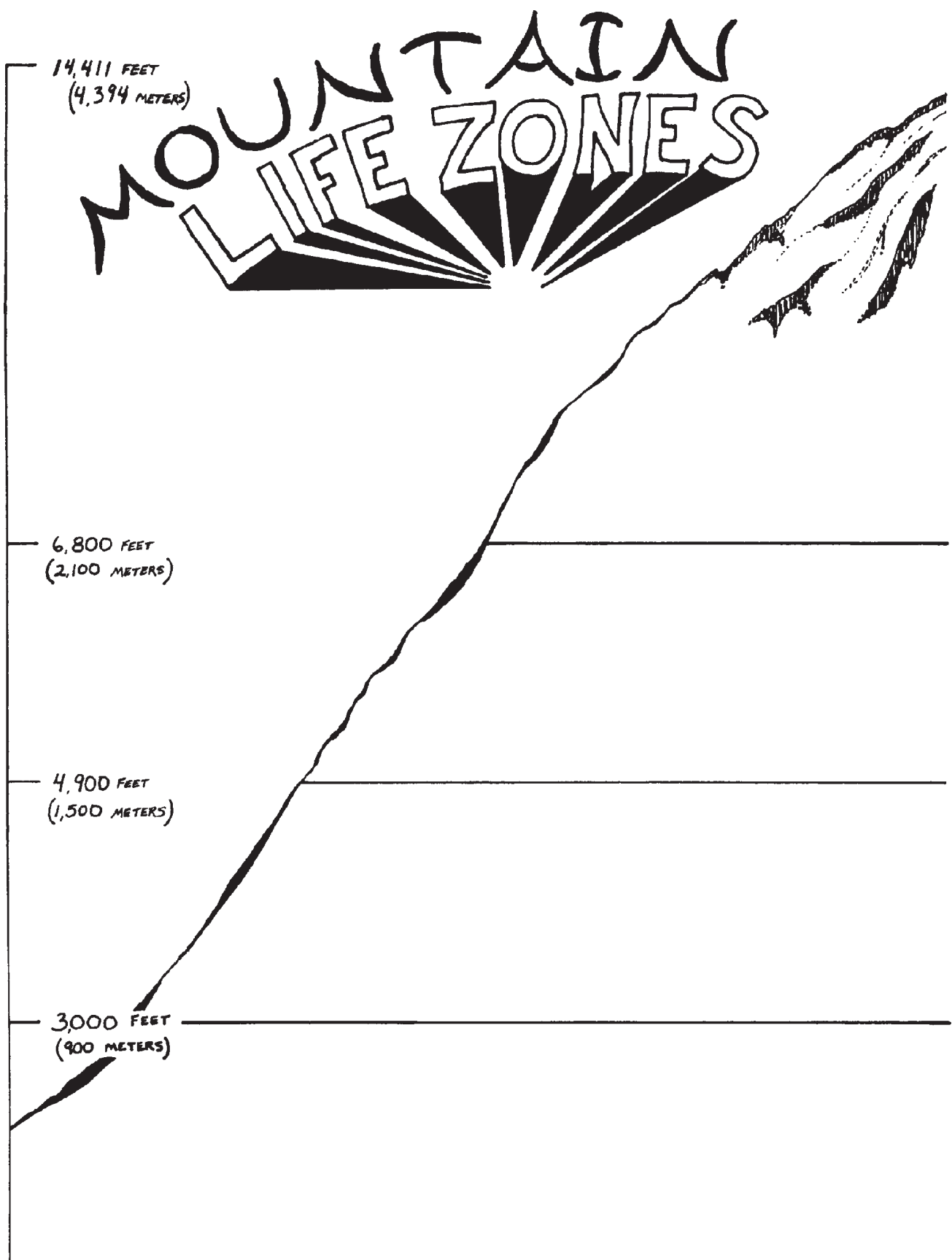
Name: _____

Date: _____



BUS B-I-N-G-O

MAPLE TREE	NISQUALLY RIVER	GIFT SHOP	RECREATION SIGN	CLEARCUT
ALDER LAKE	CONSTRUC- TION WORK	STREAM	TRAIN	BIRD
SCHOOL	HORSE	FREE	LOGGING TRUCK	DOUGLAS FIR TREE
BRIDGE	FARM	CHURCH WITH A STEEPLE	MOUNT RAINIER	BOAT
MOUNT RAINIER NATIONAL PARK SIGN	ALDER DAM	R.V.	LOG CABIN	NORTHWEST TREK SIGN



MOUNTAIN LIFE ZONES

Check off the
plants and animals
you see or hear in
each life zone in
Mount Rainier
National Park.

LOWLAND FOREST ZONE (below 3,000 ft.)

Trees:

- ☐ grand fir
- ☐ cottonwood
- ☐ Douglas-fir
- ☐ western red cedar
- ☐ western hemlock
- ☐ Pacific yew
- ☐ vine maple
- ☐ other

Other Plants:

- ☐ devil's club
- ☐ swordfern
- ☐ goat's beard lichen
- ☐ mushrooms
- ☐ other

Birds:

- ☐ barn swallow
- ☐ mountain chickadee
- ☐ varied thrush
- ☐ Steller's jay
- ☐ pine siskin
- ☐ dark-eyed junco
- ☐ common flicker
- ☐ other

Flowers:

- ☐ trillium
- ☐ salal
- ☐ Oregon grape
- ☐ vanilla leaf
- ☐ skunk cabbage
- ☐ bunchberry dogwood
- ☐ twinflower
- ☐ foamflower
- ☐ violets
- ☐ coral root
- ☐ other

Mammals:

- ☐ shrew
- ☐ bat
- ☐ Townsend chipmunk
- ☐ Douglas pine squirrel
- ☐ deer mouse
- ☐ raccoon
- ☐ black-tailed deer
- ☐ other



Douglas
Fir

PACIFIC SILVER FIR ZONE (3,000 - 4,900 ft.)

Trees:

- ☐ Pacific silver fir
- ☐ Alaska yellow cedar
- ☐ noble fir
- ☐ western white pine

Flowers:

- ☐ queencup bead lily
- ☐ bunchberry dogwood
- ☐ pipsissewa
- ☐ Cascades azalea



Pacific
Silver Fir

___ western hemlock
___ Douglas-fir
___ other

___ huckleberry
___ wintergreen
___ other

Mammals:

___ deer mouse
___ red-backed vole
___ long-tailed weasel
___ pine marten
___ black-tailed deer
___ elk
___ other



SUBALPINE ZONE (4,900 - 6,800 ft.)

Trees:

___ subalpine fir
___ mountain hemlock
___ whitebark pine
___ other

Flowers:

___ avalanche lily
___ bistort
___ false hellebore
___ cinquefoil
___ spirea
___ western anemone
___ lupine
___ heather
___ shootingstar
___ spreading phlox
___ paintbrush
___ monkeyflower
___ other

Birds:

___ gray jay
___ Clark's nutcracker
___ common raven
___ blue grouse
___ red-tailed hawk
___ gray-crowned rosy finch
___ other

Mammals:

___ pika
___ snowshoe hare
___ marmot
___ golden-mantled ground squirrel
___ yellow pine chipmunk
___ other

___ black-tailed deer
___ elk
___ pine marten
___ black bear
___ pocket gopher

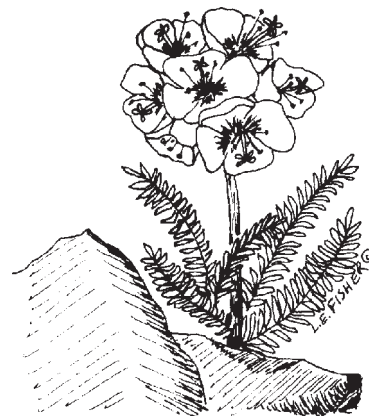
ALPINE ZONE (6,800 - 14,411 ft.)

Plants:

___ moss campion
___ willow grass
___ Tolmie saxifrage
___ lupine
___ fleabane
___ paintbrush
___ lichen
___ other

Animals:

___ ravens
___ rosy finch
___ deer mouse
___ mountain goat
___ other



Sky-Pilot

GLACIAL RIVER STUDY

Complete the following tasks with your group.

Work in the location your teacher tells you. Be very careful not to stand too close to the edge of the steep river banks:

1) Have one member of your group collect a jar of water.

2) Describe the water: _____

3) Take the temperature of the water and write it down here: _____

4) If you have a water test kit determine the pH and dissolved oxygen:

pH _____ DO _____

5) Estimate the depth and width of the river and write it here:

Depth: _____ ft. Width: _____ ft.

6) Describe the river pattern: _____

How many channels do you see? _____ What is this river pattern called?

7) Do you hear any rocks knocking into each other? _____

What is causing them to do this? _____

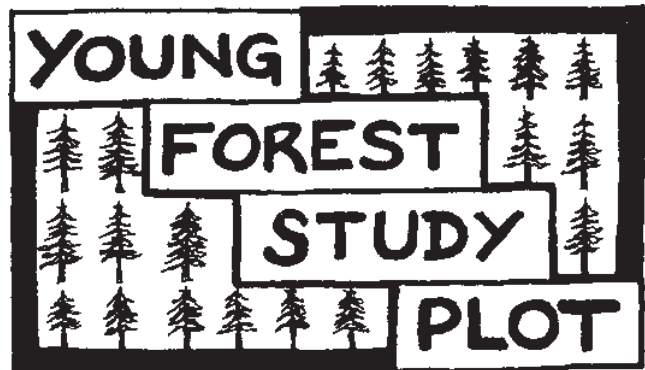
8) To measure the stream flow first take a 25 foot string and stretch it along the shore between two students. Next, drop a stick into the water at the upstream end of the string and using a stopwatch, measure how many seconds it takes for the stick to move downstream the 25 foot length.

Write down the number of seconds it took: _____

You will be calculating the stream flow velocity and volume back in the classroom.

1) Mark off your 15' x 15' study plot in the area that your teacher assigns you.

Study your area, looking at everything, from the trees and smaller plants, to the logs on the ground, soil, light, animals, etc.



Take the temperature of the air and soil and write it down here.

Air: _____ Soil: _____

Is your area sunny, shady, or in between? _____

2) Answer the following questions:

How many different kinds of trees are there? _____ Write down the names of any trees you can identify: _____

Estimate the height and circumference of your largest tree. (*Hint: the length of your outstretched arms is approximately equal to your height.*)

Height: _____ Circumference: _____

Are there any plants living on the trees? Describe them: _____

How many other kinds of plants are there? _____ Name any of these that you recognize: _____













How many fallen logs are there? _____ How many snags or standing dead logs? _____ Why are they important to the forest?


Do you see any animals or animal signs? _____ If so, name them: _____

Feel the soil for its texture and moisture. Describe how it feels: _____


3) Map your plot on the grid below.

Use the symbols in the key to show the location of the trees, plants, logs, snags, etc. in your study plot. Include tree circumferences and species, if possible.

 Broadleaf Trees				 Mammal
 Conifer				 Insect
 Shrub				 Bird
 Fern				 Mushroom
 Snag				 Flower
 Fallen Log				 Boulder



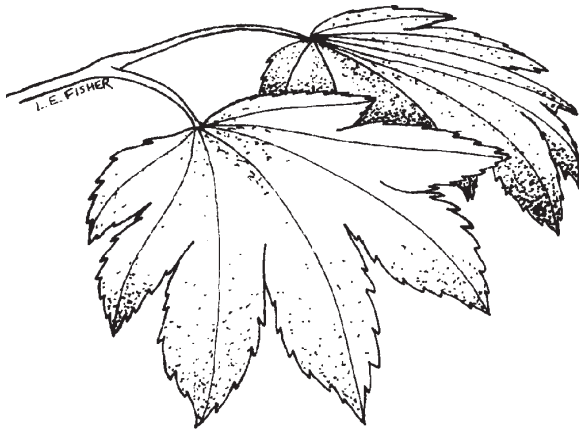
How Wet are Your Woods



After you find a place for your collection jar, observe the area around you. Use this sheet to record your information.

- 1) When you look straight up, how much of the sky is covered by tree branches and leaves? (about half, three quarters, none?) Describe what you see.
- 2) What kinds of plants are growing near your jar? (trees, ferns, mosses, other small plants?)
- 3) How close is your jar to the nearest tree or shrub?
- 4) How soggy is the ground around your jar? Are there muddy spots nearby? Are there puddles, or has all the water soaked into the ground?
- 5) Are you standing on a hillside, or is the ground level where you are?
- 6) After 30 minutes, measure the amount of water collected at your site. Record the amount here.





BREATHING LEAVES

- 1) With your group find a branch with lots of leaves, a shrub, or a small plant in a sunny spot. (Remember, needles are also leaves!) Place the plastic bag over the branch or plant and secure it tightly by tying the open end with your piece of string. Leave it in place and proceed with your Old-Growth Forest Study Plot. You will be checking this later.
- 2) Thirty to sixty minutes later check your plastic bag. Do you see any water droplets or thin fog inside the bag? _____
If so, where did this moisture come from? _____

- 3) This water is a product of what process? _____
- 4) What normally happens to the water that trees and plants give off?

- 5) Look at the underside of a conifer needle. The white stripes are actually rows of tiny holes called stomates that release the water from the tree, just as you sweat.
- 6) Back at school you will be calculating how much water this whole forest is transpiring through its green leaves!

**1) Mark off your 15' x 15'
study plot in the area
your teacher assigns you.**

OLD-GROWTH STUDY PLOT

Before proceeding, complete Step 1 of either "Breathing Leaves" or "How Wet Are Your Woods?" in your Log Book. Now study your area, looking at everything, from the trees and smaller plants, to the logs on the ground, soil, light, animals, etc.

Take the temperature of the air and soil and write it down here.

Air: _____ Soil: _____

Is your area sunny, shady, or in between? _____

2) Answer the following questions:

How many different kinds of trees are there? _____ Write down the names of any trees you can identify: _____

Estimate the height and circumference of your largest tree. (*Hint: the length of your outstretched arms is approximately equal to your height.*)

Height: _____ Circumference: _____

Are there any plants living on the trees? Describe them: _____

How many other kinds of plants are there? _____ Name any of these that you recognize: _____

How many fallen logs are there? _____ Feel one and describe it: _____

What will this rotting log turn into? _____


How many snags or standing dead logs? _____ Why are they important to the forest? _____

Do you see any animals or animal signs? _____ If so, name them: _____


Feel the soil for its texture and moisture. Describe how it feels: _____

3) Map your plot on the grid below:


Use the symbols in the key to show the location of the trees, plants, logs, snags, etc. in your study plot. Include tree circumferences and species, if possible.




Broadleaf
Trees




Conifer




Shrub




Fern




Snag




Fallen Log




Mammal




Insect




Bird



Mushroom



Flower



Boulder

Biodiversity Hunt

When you complete your plot study, check off as many items as you can find on the biodiversity hunt. Draw examples if you would like.

Be sure not to pick or collect anything!

_____ At least three different sized leaves from the same plant

_____ At least three different kinds of producers

_____ At least three different animal signs

_____ At least three different kinds of bark

_____ At least three different colors on one plant

_____ At least three different kinds of seeds

_____ At least three different lichens

_____ At least three different flowers or fruits

_____ At least three different kinds of leaves

_____ At least three different textures

_____ At least three different kinds of decomposers

_____ At least three different shapes

Last But Not Least!

Complete your Log Book pages for “Breathing Leaves” or “How Wet Are Your Woods?”

RICKSECKER POINT

First Viewpoint

WARNING: STEEP CLIFFS! STAY OFF AND BEHIND THE ROCK WALLS!

Stop and observe the Nisqually Glacier and river.

Follow the Nisqually River up the valley to the present terminus of the Nisqually Glacier. The glacier is disguised by a heavy rock covering. Look carefully for the dark area. This is the terminus of the glacier. Believe it or not, everything above this point is glacial ice covered with debris.

In 1840 the Nisqually Glacier extended 900 feet down the valley from the bridge, the most advanced the Nisqually Glacier has been since the Ice Age.

Coming down the valley from the glacier notice the succession from rocks to shrubs to forest on the east side. How do you explain this change from bare rock to forest?

Second Viewpoint

WARNING: STEEP CLIFFS! STAY OFF AND BEHIND THE ROCK WALLS!

Look down into the valley and see if you can find the bridges at the Carter Falls Trailhead.

Now look southwest and imagine the entire valley filled with ice up to the level where you are standing! This was the “ancestor” of the Nisqually Glacier which covered the area 10,000 years ago, during the Evan’s Creek Glaciation.

Look up the valley toward the Mountain. Do you see any avalanche slopes? Do you see where the life zones change from forest to subalpine? From subalpine to alpine?

As you ride the bus from here to Paradise you will be driving through the Pacific silver fir life zone. Fill in your picture for this life zone. How is the forest different up here from the forest at Longmire?

Snow What ?

**Analyze the snow if there's any on the ground.
Do this activity near the parking lot.**

- 1) Pick up a handful of snow and describe the snow's texture, color, and wetness/dryness (look at it with a hand lens):

- 2) With your group collect some snow into a calibrated container, measure its volume, and record it here: _____ Estimate how much water will be in the container after the snow melts: _____

- 3) Place it in a warm spot, such as on the school bus. Upon returning to the bus, measure the volume of liquid water in the container when the snow has all melted. _____

- 4) Determine the ratio of volume of snow to amount of liquid water by dividing the volume of snow by the volume of the liquid: _____

**Snowfall information helps us determine runoff in the spring
and make predictions for the water and electrical supply,
salmon habitat requirements, and flood dangers.**



Bridge

1) What force of nature bent the railing?

2) Where do you think Dead Horse Creek will end up?

3) Is the creek coming from a glacier or from snowmelt? _____

How do you know? _____

Weather Station

4) Why is the weather station so tall? _____

5) How much snow do you think is on the ground at any one time?

6) What is the average snowfall here at Paradise? _____

7) How does all this snow relate to why Mount Rainier has so many glaciers?

8) Take a temperature reading and record it here: _____

Fork in Trail

9) Look at the mountain. How many glaciers can you distinguish?

_____ Can you see crevasses? _____

Where on the glacier are the crevasses? _____

What signs of erosion can you see? _____

What would cause this erosion besides glaciers? _____

As you approach the viewpoints notice the meadow rehabilitation work (if the ground is free of snow). The plants which grow in the subalpine zone are very fragile and are easily impacted by human footsteps. The Park Service is trying to replant areas damaged by people going off the trail. Please be careful to **always stay on the paved trails** while at Paradise.

WARNING: STEEP CLIFFS! STAY ON TRAIL! NO RUNNING!!

Third Viewpoint

10) Describe the Nisqually Glacier: _____

11) How did all the rock debris get on the glacier? _____

12) Follow the moraine (gravel cliff) on the canyon side up to the vegetation line. That's the 1840 lateral moraine which the Nisqually Glacier left behind after it retreated. Describe it below:

13) Look at the snout. Notice it is concave (sunken in).

Does that mean the glacier is advancing or retreating? _____

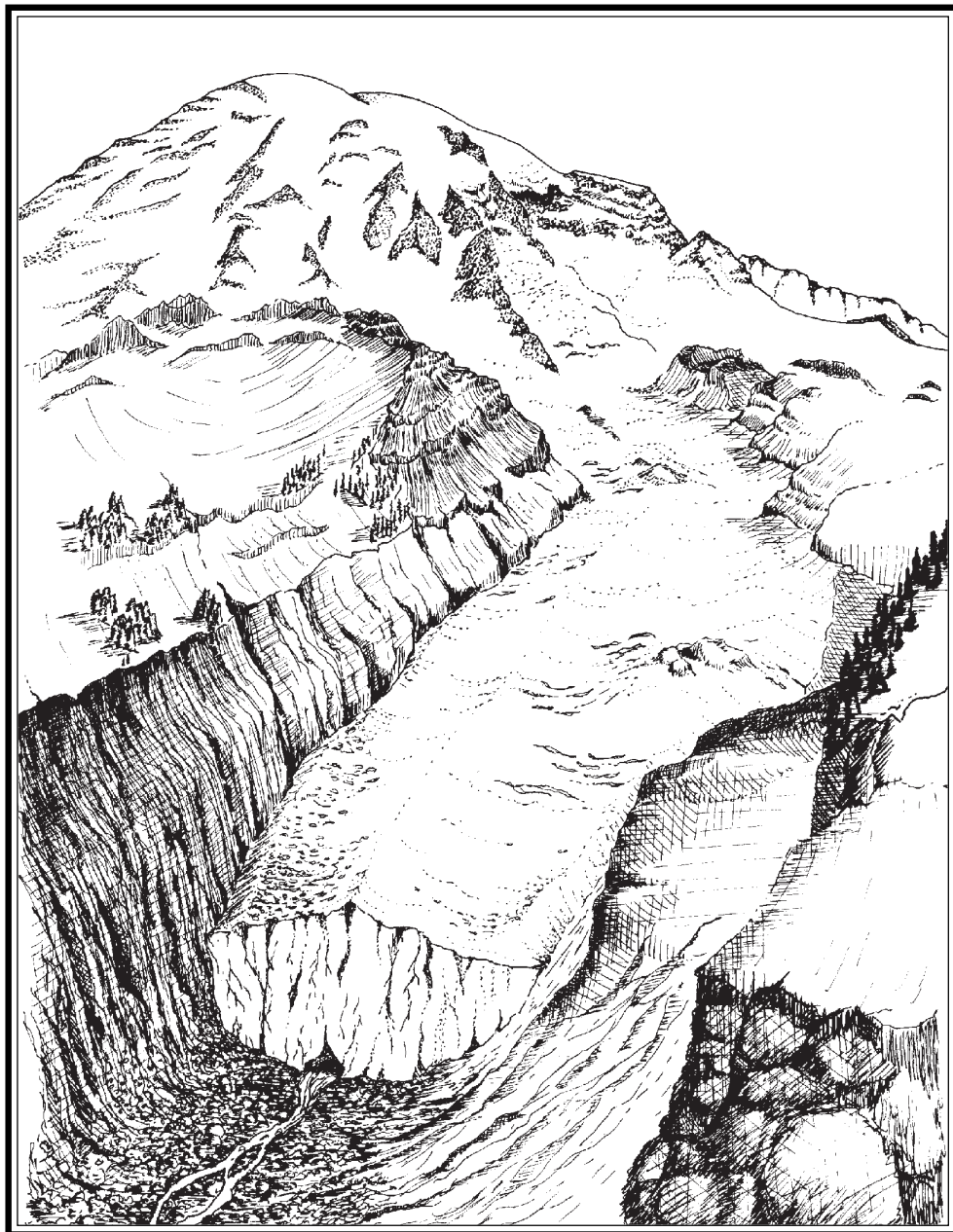
14) What is the sound we hear? _____

Where does all the water flowing out of the glacier come from? _____

Look and listen for rockfalls...

15) View the Nisqually Glacier. Identify the following features and label them on the drawing:

- | | |
|---------------------|-------------------------------------|
| a. lateral moraines | b. icefall |
| c. crevasses | d. terminus or snout |
| e. braided river | f. the start of the Nisqually River |
| g. Wilson Glacier | h. rock debris on the glacier |
| i. summit | |



16) Describe the Nisqually Glacier in a cinquain poem as follows:

Nisqually Glacier
(or synonym)
adjective *adjective*
verb *verb* *verb*
(four words describing how it makes you feel)
Nisqually Glacier
(or synonym)

_____ _____

_____ _____ _____

_____ _____ _____ _____

17) Before you leave the viewpoint fill in the alpine zone (the zone of rock and glaciers and very few plants) on your life zone picture.

On the walk back look at the view of the Tatoosh Range and see if you can find the cirque by Pinnacle Peak. This is the source of a small glacier called the Pinnacle Glacier.

18) As you return to the fork in the trail try to find trees that are skinny , flagged (branches on one side only), contorted, and topped. Why do they grow like this?

19) How does this forest compare to the lower old-growth forest?



Main Floor

- 1) Find your location on the relief map.
- 2) What is the symbol of the National Park Service? Sketch it here:
- 3) What is the elevation of Paradise? _____
- 4) How much snow fell at Paradise in 1971-1972? _____

Exhibit Room 1

- 1) How do glaciers move? _____
- 2) Why are they important to people in cities? _____

- 3) Name the biggest erosion event at Mount Rainier.

- 4) Look at the rocks on exhibit. What natural force formed them?
_____ shaped and polished them? _____
- 5) What special equipment is needed to climb on glaciers on Mount Rainier?

6) The subalpine zone is the home to many beautiful wildflowers. Select your favorite one on display, sketch it, and write the name.

7) How have people damaged the Paradise meadows?

8) Why is it difficult for subalpine meadows to recover?

9) How can you help the Paradise meadows and flowers?

Exhibit Room 2

1) Name three animals that live in the subalpine zone and one adaptation of each for surviving at this altitude.

Observation Level

1) Look at a profile map and name two landmarks that are shown.

2) Can you spot them today? _____

3) Who was Camp Muir named after? _____

4) What is the elevation of Camp Muir? _____

5) On the next page, draw a sketch of what you see from here looking outside in any direction.

Slide Program

List three things you learned about Mount Rainier from the slide program.

1) _____

2) _____

3) _____